Bioc 401/402 Instructor:

Dr. George Phillips (georgep@rice.edu; W200Q GRB)

Biosciences undergraduate coordinator:

Ms. Mariah McClarty (mam22@rice.edu; 713-348-4207)

Office Hours: Office hours are by appointment.

Course objectives and expected learning outcomes

- To conduct independent, mentored laboratory research in areas of the Biosciences that may include
- molecular genetics, cell and developmental biology, microbiology, bioinformatics, biophysics, and
- biochemistry.
- To increase knowledge of and experience with current research methodologies and their limitations
- To gain scientific communication experience through written and oral reports
- To gain first hand experience as to what a career in research may be like

Requirements for Bioc 401/402/412 course credit

Summary: BIOC 401/402/412: The Biochemistry and Cell Biology Honors Research Program is a suite of courses offering our seniors and advanced juniors the opportunity to perform a two-semester individual research project in Biochemistry and Cell Biology. This immersive program is intended to give students a first-hand experience of what a career in research would entail. Students interested in graduate school are strongly encouraged to apply for consideration for honors research. Students having performed BIOC 310 research in an off-campus laboratory in the Texas Medical Center will be eligible to apply to perform honors research in that laboratory. These courses (BIOC 401/402/412) function as a set and must all be taken in the same academic year. Registration for any of the courses requires a commitment to register for all three.

Criteria for participation in the course series include:

- Strong performance in BIOC 211 and either BIOC 301 or BIOC 341 and other BIOC degree courses
- taken to date
- A grade of A in independent research (BIOC 310, HONS 470/471, or other approved research course)
- Research professor recommendation
- Research proposal (previous accomplishments in research area, abstract, specific aims, timeline)

Required Texts and Materials. No textbooks are required. However, it is expected that students will maintain regular reading of primary literature articles relevant to their specific research discipline within the biosciences.

Required writing assignments and presentations for the individual courses

BIOC 401—Fall semester, 5 credit hours
Requires at least 15 hours of laboratory research per week, a project description (revised from application),

monthly reports, a formal progress report (abstract, aims, progress toward aims, discussion of results, plans for the spring semester), and an oral presentation.

Research project description: Prepare a revised 2-page research project description containing an introduction that summarizes the basis of the planned project, experimental aims for the project, a brief experimental design, and references (references are not counted as part of the 2-pages). Develop this proposal in consultation with your 401 advisor and load into the Bioc 401 folder in Owlspace before the end of the third week of classes. To name your file, use the convention: *LastnameInitial*_Description*(.docx, .pdf)*, (eg. NikonowiczE_Description.pdf).

Monthly reports: You should coordinate with your faculty advisor regarding the regular submission of research reports. The content and frequency will vary among labs, but should be no less frequent than monthly. The Bioc 310 manual (**www.bioc.rice.edu/bioc310/**) contains templates and examples for weekly reports if needed. These reports are not loaded to Owlspace.

Formal progress report: You are required to submit a progress report to your faculty advisor at the end of the semester. A copy of this report should also be placed in the Bioc 401 folder on Owlspace. To name your file, use the convention: *LastnameInitial*_ProgRept*(.docx, .pdf)*, (eg. NikonowiczE_ProgRept.pdf). Use the co The report is due **Friday, December 4, 5pm**. The report should be a minimum of 3 pages (excluding references) and include: abstract, aims, progress toward aims, discussion of results, plans for the spring semester, and references. Your advisor may require additional content, so please coordinate with your advisor.

Oral presentation: At the end of the semester, the 401 students will meet as a group during the lunch hour and each student will give a 10-minute presentation on their project. The general presentation format will be:

(15%) 1-2 slides for a very brief background including the goals and specific aims of the student's research project

(75%) experimental results and any conclusions that can be made at this time
(10%) plans for next semester

A copy of the presentation will be loaded to the Bioc 401 folder in Owlspace afterward. To name your file, use the convention: *LastnameInitial*_Presentation1*(.pptx, .pdf)*, (eg. NikonowiczE_Presentation1.pdf).

The date(s) of the presentations will be made available in a separate e-mail.

*Please meet with your faculty research advisor to determine if there are **additional lab-specific requirements** (eg, participation in/presentation at weekly lab group meetings).*

BIOC 402—Spring semester, 5 credit hours

Requires at least 15 hours of laboratory research per week, monthly reports, a thesis (substantial research paper) and a poster presentation at the Rice Undergraduate Research Symposium (RURS).

Monthly reports: You should coordinate with your faculty advisor regarding the regular submission of research reports. The content and frequency will vary among labs, but should be no less frequent than monthly. These reports are not loaded to Owlspace.

Thesis: A final report in the form of a thesis will be due at the end of the Spring semester. *You must coordinate with your faculty advisor regarding the due date. However, the reports generally are not due earlier than the last day of classes.* Your advisor will be required to submit your course grade by **May 4, 2016**. The format for the thesis should minimally include: a summary (~250 words), introduction, methods, results, discussion, and references. The 12-15 page report (exclusive of summary and references) should be double spaced using12 pt Times or 11 pt Arial font. Figures are included in the page limit. Papers from journals within your specific discipline of the biosciences can provide helpful examples. Your advisor may require additional supplemental information. A copy of the thesis will be loaded to the Bioc 402 folder in Owlspace no later than the last day of finals. To name your file, use the convention: *LastnameInitial*_Thesis*(.docx, .pdf)*, (eg. NikonowiczE_Thesis.pdf).

Poster presentation: Students are required to present a poster at the RURS conference/symposium toward the end of the Spring semester.

BIOC 412—Spring semester, 1 credit hour

This companion seminar requires attendance at course meetings and a formal scientific presentation of research performed while enrolled in the Honors Research Program.

Formal scientific presentation: Towards the end of the semester, the 402 students will meet as a group and each student will give a 20-minute presentation on their project. The general presentation format will be:

(15%) 1-2 slides for a very brief background including the goals and specific aims of the student's research project

(80%) experimental results and any conclusions

(5%) future directions

A copy of the presentation will be loaded to the Bioc 402 folder in Owlspace afterward. To name your file, use the convention: *LastnameInitial*_Presentation2*(.pptx, .pdf)*, (eg. NikonowiczE_Presentation2.pdf).

The date(s) of the presentations will be made available in a separate e-mail. Depending on the number of students and course conflict, the presentations may be scheduled for a Saturday morning.

Honor code for Bioc 401/402/412

Guidelines for collaboration with colleagues: As research is a collaborative effort, you are expected to communicate with and receive input from others. While the work reported in your written materials should be your own, you may include data and figures produced by other members of your lab as background if they are relevant to your conclusions about your own research and are properly attributed to the individual(s) who produced them. Although many of the projects in a lab originate from a common starting point, your abstract, summary, and introduction should be in your own words and not simply copied (plagiarized) from existing

lab documents.

Guidelines for proper citation of written work: Plagiarism is a form of academic fraud and is a violation of the Rice Honor Code. Forms of plagiarism include: copying a source word-for-word, inadequate paraphrasing without proper acknowledgement, and claiming another's ideas as one's own. Bioc 401/402/412 students are expected to educate themselves in the use of proper citations in all of their written work. The following three sources will be helpful:

- the Rice Honor Code information on Academic Fraud and Acknowledgement of Sources: http://honor.rice.edu/honor-system-handbook/
- the document, "Recognizing and Avoiding Plagiarism" by Dr. Janice L. Hewitt, which is posted in the resources folder on the Bioc 310 Owl-Space site
- the Bioc 310 manual sections, "When should I reference something?" and "How do I reference material from a review article?" written by Dr. Richard Gomer

Disability support

Guidelines for students with disabilities: If you have a documented disability that will impact your work in this class, please inform your research professor to discuss your needs. Additionally, you will need to register with the Disability Support Services Office in the Allen Center. For more information visit the Rice Disability Support Services site (www.dss.rice.edu).

Syllabus change policy. This syllabus is only a guide for the course and is subject to change with advanced notice.